

TABLE OF CONTENTS

GWS 1-01	INTRODUCTION AND SCOPE	2
1.0	PURPOSE AND SCOPE	2
2.0	REFERENCES	3
3.0	ACRONYMS AND DEFINITIONS	3
4.0	GENERAL	5
5.0	PROCEDURE	5
6.0	ATTACHMENTS	8
Attachment 1: Partial Exemption Process.....		8

RECORD OF REVISIONS

Rev	Date	Description	POC	OIC
0	8/16/04	Initial issue.	Kelly Bingham, <i>FWO-DECS</i>	Gurinder Grewal, <i>FWO-DO</i>

CONTACT THE RESPONSIBLE ENGINEERING STANDARDS POC
for upkeep, interpretation, and variance issues

GWS 1-01	Welding POC / Committee http://www.lanl.gov/f6stds/pubf6stds/engrman/HTML/poc_techcom1.htm#weld
-----------------	---

GWS 1-01 INTRODUCTION AND SCOPE

1.0 PURPOSE AND SCOPE

- A. The purpose of the LANL Welding Program (Chapter 13) as described herein is to establish and identify welding requirements and criterion for welding activities (programmatic and facility) performed by or for the Laboratory (on or off site), including those activities performed by subcontractors, including but not limited to SSS, facility, project, program, and other sub-contracted welding operations.
- B. The LANL Welding Program addresses the following criteria¹:
 - 1. Appropriate design of welded structures items and components. This is accomplished by application of other appropriate Chapters of the LANL Engineering Standards Manual.
 - 2. Welding and brazing performed by or for LANL, SSS, and subcontractors is performed to properly qualified and approved procedures.
 - 3. Welding and brazing performed by or for LANL, SSS, and subcontractors is performed by certified welders who have demonstrated their welding qualifications by test.
 - 4. Consumable welding materials are properly procured, received, stored, controlled, and issued to prevent inadvertent or intentional use by unqualified personnel.
 - 5. Welding Inspection will be done as required to meet national consensus Codes and Standards or as appropriately specified in absence of applicable Codes and Standards.
- C. The Scope of LANL's Welding Program provides administrative, engineering, technical, and process controls for welding and brazing activities performed by or for LANL, except as noted in Section 5.2, Exclusions.
- D. Subcontractors employed by or for LANL shall be required in contract documents to comply with the applicable requirements of this program. This is intended to include full participation in the LANL Welding Program. Only subcontractors with the applicable ASME or National Board Certificate(s) of Authorization² shall perform welding on pressure-retaining code-stamped items after their welding program has been reviewed and accepted by LANL WPA.
- E. For welding activities that would normally fall outside the defined scope of national consensus codes and standards for fabrication and welding, such codes and standards shall be adopted and used to the extent possible.³ The WPA shall have the authority to determine applicability of codes in these cases.
 - 1. Applications that are similar to those included in national codes and standards shall utilize such codes and standards (and corresponding LANL welding standards) as if they applied.

¹ Criteria from 10 CFR 830.122, DOE Order 414.1A, ASME B&PVC, AWS Structural Welding Codes and API - 1104

² Certificate holders are organizations that have been authorized by the ASME to perform various activities in accordance with the requirements of the ASME Boiler and Pressure Vessel Code.

³ Director Pete Nanos expectations stated in 6-10-2003 Meeting (EMRef-32); and DOE Order 440.1A, Worker Protection Management for DOE Federal and Contractor Employees, Attachment 2 Paragraph 20.c. Also, adaptation of existing standards is usually more cost effective than development of new procedures, specs, and inspection criteria. NOTE: EMRef is a Standards Program cataloging system for hard-to-find references.

Volume 1, General Welding Standards

GWS 1-01 – Introduction and Scope

Rev. 0, 8/16/04

EFFECTIVE UPON ISSUE

2. Applications that are not similar in materials or processes to a Code or Standard shall define and produce the following:
 - Design basis; i.e., mechanical properties, part geometry, acceptance criteria.
 - Define a method to verify that the welding procedure can produce acceptable welds
 - Define a method to demonstrate that the welder has the skill to produce sound welds in accordance with the specified welding procedure (reference GWS 1-02, *Administrative Control of Welding and Brazing*, paragraph 5.3.B)
 - If filler material is used, procure and control filler materials per GWS 1-03
 - Identify methods and perform inspections, required to judge welds against predetermined acceptance criteria.
 3. *Guidance: National codes and standards controlling welding were available from the LANL intranet (inside firewall) from the Research Library's Information Handling Services subscription at writing at <http://lib-www.lanl.gov/infores/stand/ih/index.htm> . This included AWS and ASME B31 series piping codes (via Specs & Stds link) and ASME B&PV Code (via TextAdvantage link). It did not include all the API and AWWA standards at writing; contact WPA.*
- F. This Program supersedes the corresponding SSS Welding Program elements upon the effective date of each LANL GWS section.

2.0 REFERENCES

None

3.0 ACRONYMS AND DEFINITIONS

Acronym/Term	Description
AHJ	Authority having jurisdiction
AWS CWI	American Welding Society, Certified Welding Inspector
C of C	Certificate of Compliance
CMTR	Certified Material Test Report
ESM	LANL Engineering Standards Manual

Acronym/Term	Description
Facility	Normally at LANL, facility is a synonym for Real Property and Installed Equipment. RP&IE is the land, improvements on the land such as buildings, roads, fences, bridges, and utility systems and the equipment installed as part of the basic building construction that is essential to normal functioning of a building space, such as plumbing, electrical and mechanical systems. This property/equipment is also referred to as institutional or plant and was formerly known as Class A. [from DOE Order 4330.4B] In the context of this chapter's nuclear-applicable sections, facility refers to the definition of nuclear facility in 10 CFR 830 and includes process (programmatic) systems and activities.
GWS	General Welding Standards
hazard category	The DOE-STD-1027 category as defined by LIR 300-00-05, <i>Facility Hazard Classification</i> . http://labreq.lanl.gov/pdfs/ops/01_operations/lir3000005.pdf <i>Guidance: Nuclear facilities will be Cat 1, 2, 3, or Radiological; non-nuclear facilities are Category A, B, or C (becoming High, Medium, and Low).</i>
LIR	Laboratory implementation requirements.
ML	Management level, defined in LIR 230-01-02, Graded Approach for Facility Work (or Programmatic equivalent). http://labreq.lanl.gov/pdfs/ops/01_operations/lir2300102.pdf . <i>Guidance: Related LIG: http://labreq.lanl.gov/pdfs/ops/01_operations/lig2300102.pdf</i>
POC	Point of contact. For the ESM discipline POCs see http://www.lanl.gov/f6stds/pubf6stds/engrman/HTML/poc_techcom1.htm
PQR	Procedure Qualification Records
Program/ Programmatic/ PP&PE	A synonym for Personal Property and Programmatic Equipment. PP&PE is equipment used purely for programmatic purposes, such as reactors, accelerator machinery, chemical processing lines, lasers, computers, machine tools, etc., and the support equipment dedicated to the programmatic purpose. This property/equipment is also referred to as organizational, research, production, operating or process and was formerly known as Class B. [DOE Order 4330.4B]
PS-IQM	LANL Performance Surety Division – Institutional Quality Manager (PS-1)
Safety Class (SC) SSC	<i>Safety class structures, systems, and components</i> means the structures, systems, or components, including portions of process systems, whose preventive or mitigative function is necessary to limit radioactive hazardous material exposure to the public, as determined from safety analyses. [10 CFR 830: § 830.3 Definitions.]
SSC	Structures, systems, and components.
WFP	Welding Fabrication Procedure
WMR	Weld Material Requisition
WPA	[LANL] Welding Program Administrator
WPS	Welding Procedure Specification

Acronym/Term	Description
WTS	Welding Technique Sheet

NOTE: The terms WPS, welding, WTS, and WFP as used throughout the LANL Welding Program also apply to brazing and brazing procedures unless noted otherwise. In addition, use of the terms “Welder” and “Welding Operator” also apply to “Brazer” and “Brazing Operator” where applicable.

4.0 GENERAL

4.1 Roles and Responsibilities

- A. The **LANL Engineering Standards Manager** is responsible for overall implementation and for the engineering, technical administration and distribution of the LANL Welding Standards in accordance with engineering specifications, national codes and standards, state or local regulatory standards as deemed pertinent, and this program manual.
- B. The **LANL Welding Program Administrator (WPA)** is responsible for assisting the engineer-of-record for programs and projects in establishing welding and inspection requirements in engineering drawings and specifications, consistent with systems safety criteria, applicable codes and standards, and requirements of the LANL Welding Program.
- C. **PS-1, IQM** is responsible for auditing activities performed in accordance with the LANL Welding Program for compliance with applicable requirements.
- D. **SSS** is responsible for providing resources, facilities, and support activities for implementation of the LANL Welding Program, as directed by the LANL WPA.
- E. **Facility, project, program, and SSS management and supervision** shall enforce the requirements of this program within their respective areas of responsibility. They shall have the responsibility, authority, and organizational freedom to identify welding-related problems and to initiate and verify corrective action. Welding problems that cannot be resolved by the affected parties and/or LANL Welding Program Administrator shall be brought to the attention of the Division Leader for resolution.

5.0 PROCEDURE

5.1 General

- A. The LANL Welding Standards are comprised of Volumes 1 through 5, as follows:
 - **Volume 1 - General Welding Standards (GWS):** provides the administrative controls for development and implementation of the LANL Welding Program. GWSs describe the overall administrative requirements to evaluate, formulate, implement, develop, test, and maintain written procedures and provide technical assistance for all welding and brazing activities performed by or for LANL.
 - **Volume 2 - Welding Fabrication Procedures (WFP):** welding fabrication procedures prepared to provide guidance for the welder and acceptance criteria for production welds to specific code requirements.

Volume 1, General Welding Standards
GWS 1-01 – Introduction and ScopeRev. 0, 8/16/04
EFFECTIVE UPON ISSUE

- **Volume 3 - Welding Procedure Specifications (WPS):** contain engineering and technical welding requirements written to specific fabrication and construction standards, e.g., ASME, AWS, and API.
- **Volume 4 - Welding Technique Sheets (WTS):** contain job-specific controls for welding applications that are SC, SS, ML-1, or ML-2; or to limit procedure variables based on desired characteristics such as weld sequencing, profiles, finishes, etc.
- **Volume 5 - Procedure Qualification Records (PQR):** records of welding data used when welding a test coupon and which identify the essential, supplementary essential, and non-essential variables recorded during the welding of the test coupon and the destructive or nondestructive test results of tested specimens.

B. The hierarchy and the organization of the ESM for this chapter is depicted below:



5.2 Exclusions

- A. The Welding Program excluded activities do not require a Welding Procedure Specification or WFP-driven inspections, but do require an IWD, basic welder qualifications and control of filler material to meet the intent of the requirements in GWS 1-03 to prevent uncontrolled access and cross-contamination of material.⁴
1. Exclusions include:
 - a. Weapons components (diamond-stamped/War Reserve parts or prototypes of such parts that fall within the scope of QC-1).

⁴ Reference desires of Director Nanos: 6-10-2004 meeting (EMref-32), DIR-04-227 draft (EMref-35); All Hands Meeting 7/22/04 (EMRef-31), and e-mails from Jim Angelo, PS DL (EMref-34)

- b. Training and qualification coupons; coupons shall be controlled and disposed of after training is complete; they shall not be used for any useful function other than training.
- c. Process development coupons/parts; coupons/parts shall be controlled and shall not be used for any useful function other than process development.
- d. Other items, fabrications, or components not covered by the LANL Engineering Standards, other LANL mandates, or DOE Orders and whose failure would not cause personnel injury or major expense. This includes the following items:
 - Electrical motor repair - brazing or welding
 - Fence posts, gates or utility access covers - Unless required by security
 - Gutters and down spouts
 - Machine shop temporary hold-down welds
 - Mobile earthmoving equipment hard surfacing or buildup (e.g., buckets and blades)
 - Soft soldering (under 840 degrees F)
 - Temporary welds/installations - Concrete forms or tie-rods only
 - Thermocouple wire connections
 - Tool repair - brazing or welding
 - Vehicle body work and exhaust systems
- e. Welders must have requisite skill and use appropriate filler materials and processes for welding exempted activities.

5.3 Additional Exemptions

- A. Other exemptions may be granted by the WPA as determined by documenting and completion of the Partial Exemption Process using the procedure, flow chart, and form in Attachment 1.
- B. Attachment 1 may be modified or withdrawn at the discretion of the LANL WPA (without Standards Board Approval).

5.4 Welding Program Elements

- A. The LANL Welding Program defined herein incorporates the following:
 - 1. Development and processing of Welding and Brazing Procedure Specifications (WPS/BPS).
 - 2. Development and processing of Welding Procedure Qualification Tests and Record (WPQT and PQR).
- C. Development and processing of code-specific Welding Fabrication Procedures (WFP).
- D. Development and processing of Welding Technique Sheets (WTS) for specific welding techniques and process control.
- E. Welder Certification by Performance Qualification Testing (WPQT), and maintenance of qualification records.
- F. Personnel training including skills and upgrading.
- G. Weld material procurement and control.
- H. Material specifications.

Volume 1, General Welding Standards

GWS 1-01 – Introduction and Scope

Rev. 0, 8/16/04

EFFECTIVE UPON ISSUE

- I. Weld joint design.
- J. Administrative control of welding, including control of subcontractor welding activities.
- K. Visual weld inspection criteria and acceptance standards.
- L. Nondestructive examination requirements and applications.
- M. Each section of the Program is designed to be used in support of, or in conjunction with, the applicable Welding Fabrication Procedures (WFP), Welding Technique Sheets (WTS), or Welder Performance Qualification Test (WPQT).
- N. Each section of the General Welding Standards (GWS) is provided with a statement of purpose, scope, and responsibilities.
- O. These Standards contain general welding and fabrication references and guides as well as specific engineering and technical information regarding Welding Procedure Specifications (WPS), Welding Fabrication Procedures (WFP), Welding Technique Sheets (WQT), Welder Certification by Performance Qualification Tests (WPQT), Weld and Brazing Material Procurement and Control, Weld Joint Design, Post Weld Heat Treatment (PWHT), Welder Training and Testing, weld acceptance criteria, and applicability of codes and standards.
- P. Should there appear to be a conflict between any section of the Standards and other governing criteria regarding specific technical or engineering requirements the most stringent shall apply, unless specifically clarified by the WPA. All such conflicts shall be brought to the attention of the WPA for resolution.

6.0 ATTACHMENTS

ATTACHMENT 1: PARTIAL EXEMPTION PROCESS

Exhibit A: Welding Program Exemption Process Flow Guide

Exhibit B: Request for Partial Exemption